Amendments to the Specification:

Please replace the paragraph [0055], beginning at page 17, line 22, with the following rewritten paragraph:

An incident end spot ~~radius ω~~ radius ω_1 inside the GI-type photonic crystal slab of an incident end 9 is equal to or less than a maximum value ω_{2max} of a beam spot radius ω_2 inside the GI-type photonic crystal slab. However, they match in the case where a curvature radius of a wave front of a beam at the incident end is infinite (the case mainly considered hereafter), which case is shown in the drawings (same hereafter).

Please replace the paragraph [0091], beginning at page 24, line 14, with the following rewritten paragraph:

In this formula, A and B relate to a lens effect of the GRIN lens and constraint of the beam configured by space propagation of the holes while λ/ω_1 relates to diffusion of the beam due to the diffraction effect. Therefore, the first term of the right-hand side of the formula 7 contributes to components of ω_1 determined geometric-optically with no consideration of wave nature of the light and ω_2 calculated from R_1. The second term thereof contributes to the component of ω_2 resulting from the diffraction determined wave-optically with consideration of the wave nature of the light being suppressed by the lens effect represented ~~by 13~~by B.